East Asia and Southeast Asia: Similarity in Trade Structures

by

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Abstract:

This paper aims to analyse the similarity of trade structures among some selected Northeast and Southeast Asian economies. The study covers a time series analysis from 1990 to 2008. It is important to know whether these countries are becoming more or less similar in trade structures over time. The analysis provides an indication whether these economies are competitors or complements in their trade. The paper addresses a current concern on whether China is out-competing the ASEAN region. The Finger-Kreinin index (1979) is modified to compute for the net export similarity index. Data is sourced from the United Nations Comtrade database.

Keywords: trade similarity index, East Asian economies, ASEAN, trade structures.

JEL classification: F1, F14, O57.

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1. Introduction

The East Asian region has been the world's main manufacturing hub since four decades ago. The expansion of international production in this region began in the Northeast Asia. The focus then shifted to the ASEAN region and now to China (Ernst and Guerrieri 1998). High rates of economic growth in this region are in fact attributed to the significant contribution of manufacturing sector to GDP in all these economies. Many of these economies, particularly the ASEAN economies, have a notable trade sector. Some of them have trade sectors that are larger than their own GDP.

The region as the world's factory became even more prominent with China's accession to the WTO in 2001. The rising of China has raised a number of questions. One of them is the concern on whether China is out-competing the ASEAN region. Is China a competitor or a complement to these other East Asian economies, particularly the ASEAN countries?

One way to assess whether China is competing with the ASEAN countries is by examining their trade structures. If a country's trade structure is very similarly to China's, then these two economies are more of competitors to each other. Conversely, if the two countries have very different trade structures, they are then seen more as complements to each other. This is essentially the focus of the present paper.

The objective of the present paper is to conduct a simple exercise in assessing the trade structures for some selected East Asian economies. Eight countries are examined in their trade structures: China, Japan and South Korea from East Asia and Malaysia, Indonesia, Singapore, Thailand and the Philippines from Southeast Asia.

The paper is organised into six sections. Section 1 provides an introduction. A brief review of the literature particularly on the likely impact of China on the rest of the world is made in Section 2. Section 3 discusses the present study, methodology and data. Section 4 looks briefly into some economic and trade indicators of the eight countries. Section 5 presents the results and analysis of export similarity between the countries. Section 6 concludes.

2. Literature Review

A number of studies using different approaches have been conducted to ascertain the likely impact of China's increasing presence in the world economy on the rest of the world. As a whole, many studies point to the conclusion that the rise of China creates opportunities as well as challenges to the rest of the world (see for example, Gill and Kharas 2007, Winters and Yusuf 2007, Australia 2003). A general view is that developed economies are likely to benefit more from China's rapid industrial development than the developing economies, particularly those in East Asia, which may face strong competition from manufacturing exports. Some studies even suggest that China is out-competing its neighbours in the ASEAN region (Roland-Holst and Weiss 2005, Rodrik 2006). The fear of China is not only restricted to the East Asia region, but it is also felt in other developing regions such the Latin America (Moreira 2007). In addition, concerns are not just confined among the developing economies. A recent study found that China's export bundles are increasingly overlapping with the OECD exports (Schott 2008).

In a recent study by Dimaranan, Ianchovichina and Martin (2007) where a CGE exercise using a modified GTAP model was conducted to examine the likely welfare impacts and export performances in various industries under various simulation scenarios. The study found that the impact of improved growth and quality

exports in China and India is expected to bring large welfare gains to China and India but gains to other Asia Pacific economies are small. In addition, manufacturing outputs in many industries are expected to shrink as a result of China's and India's expansion.

The study conducted by the Australian Government suggests a more optimistic view. The study provides an in-depth analysis on the likely impact of China's economy on Asian and Australia's trade (Australia 2003). The study which covers the time period from the early 1990s to early 2000s, investigates on the rising concerns on whether China's rapid development is imposing threats to other countries, particularly the East Asian economies and Australia. The overall conclusion of the report is that the rise of China, particularly in its industrial expansion is on the whole, a 'positive sum game'. Developed countries in the region such as Australia and Singapore are believed to benefit from China's industrial rise. Developing countries, particularly the ASEAN economies (except Singapore) while inevitably facing an increasingly challenging environment, are still expanding strongly in competing sectors.

3. The present study, methodology and data

The present study aims to provide some updates using recent trade data on whether there have been any significant changes in trade structures among the ASEAN economies as well as some Northeast Asian economies during recent years, particular in the past five years.

This paper follows the index used in a study conducted by the Australian Government that looks into the likely impact of China's economy on other East Asian economies and Australia (Australia 2003). In this study, a net trade similarity index is formulated based on the Finger-Kreinin index (Finger and Kreinin 1979). The formula for the index, S_{jk} is:

$$S_{jk} = \left(\sum_i \min \left[\frac{X_j^i}{X_j}, \frac{X_k^i}{X_k} \right] \right) * 100$$

where

X_j^i : exports of product i by country j

X_k^i : exports of product i by country k

X_j : Total exports of country j

X_k : Total exports of country k

The variables used in the Finger-Kreinin index are export values of a product group i from a particular country j or k. The index is relatively simple for computation since export values are accessible from various data sources such as the United Nations COMTRADE database. However, as noted in the Australian Government study (Australia 2003), when production chains are internationalized, there will be an increase in exports and imports in the same product groups. This will cause increasing similarity between the exports and imports of economies involved in the production chains. Hence a high value in the index between two countries may merely indicate large amount of production sharing between the two countries and it need not necessarily suggest that the two countries are competiting with each other. The index is therefore not useful as an indicator on whether two countries are competing with each other over time.

To solve the problem, the index is modified in the following way (following the Australian Government study). Net export values are used to replace the export values in the index. By using net export values of a particular product group (i.e. exports minus imports), we can then examine whether economies are exporting value added in that product group. This modified index allows us to analyse whether a country rely on particular products for export revenues.

In the calculation for the modified index – net export similarity index, only net export values (NX) of those products having positive values are used. Products that record negative net export values will take zero values. Total net exports (TNX), used as the denominator in the export share, are obtained by summing all the net export values of all product groups. The modified index, MS_{jk} becomes:

$$MS_{jk} = \left(\sum_i \min \left[\frac{NX_j^i}{TNX_j}, \frac{NX_k^i}{TNX_k} \right] \right) * 100$$

With this modification to the Finger-Kreinin index, high or increasing index values between two countries can be used to indicate similar or increasingly similar in reliance on particular products for export revenue, hence implying high or increasing levels of competition between the countries' exports. The index can take any value between 0 to 100. A value of 0 means export profiles are completely dissimilar between two countries while a value of 100 means export profiles of the two countries are identical.

Trade data at SITC codes (Rev 3) 3-digit level are sourced from the United Nations Comtrade database for computing the index. One limitation of using SITC 3-digit level data is that it may lead to an overestimate of export similarity between countries if the aggregation of product groups hides trade flows information within sub-product groups.

4. East Asia and Southeast Asia: economic structure and trade profile

Before examining the net export similarity index among the eight countries, it is useful to have an overview of these economies' economic structure and their trade profiles.

Table 1 Value Added of Agriculture, Industries and Services to GDP (%), 2007

	Agriculture	Industry	Services
China	11	49	40
Japan*	2	30	68
Korea, Rep.	3	39	58
Malaysia	10	48	42
Philippines	14	32	54
Indonesia	14	47	39
Singapore	0	31	69
Thailand	11	44	45

Source: World Development Indicators
Note: *figures for Japan are for year 2005

Of all the countries under study, Singapore and Japan each has a large services sector in its economy (Table 1). Their services sectors contribute close to 70% of its

GDP respectively. This is followed by South Korea, with a services sector of 58% of its GDP. Agriculture sector is small relative to industry/manufacturing and services activities in these three economies.

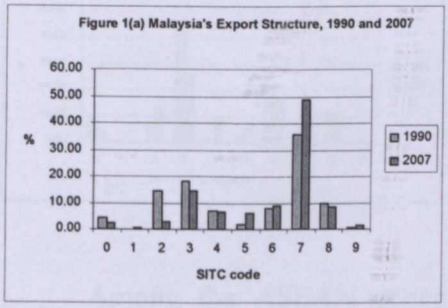
China has an economic structure that is more similar to the ASEAN countries with the exception of Singapore. These economies focus mainly in manufacturing activities while at the same time having a notable and growing share in services sector. Agriculture sector in these countries contribute to about 10 – 11 per cent of GDP.

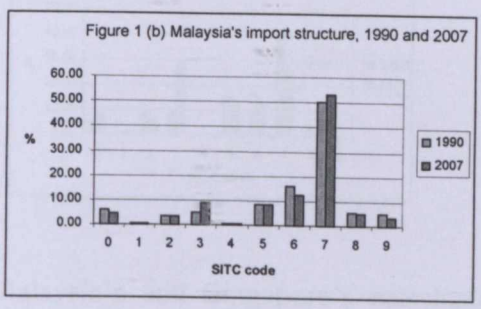
In addition to information from Table 1, all the ASEAN economies have a significant trade sector in their economy. Singapore and Malaysia are the two most open economies, with a ratio of total trade to GDP of 250% and 150% respectively in 2008 (ASEAN Statistics).

A brief examination on the eight countries' export and import data recorded at SITC (Rev 3) 1 digit level during 1990 (1993 for China) and 2007 shows some interesting findings[1].

a) ASEAN economies

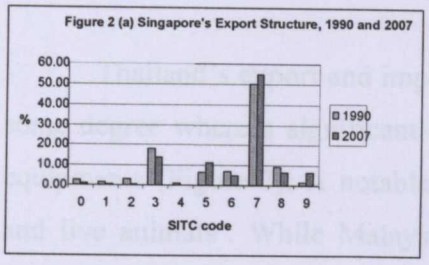
Malaysia:

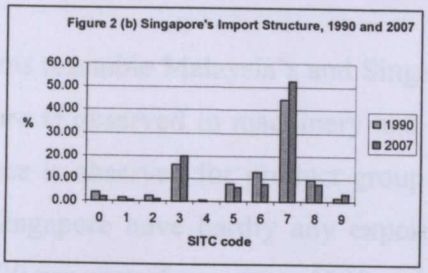




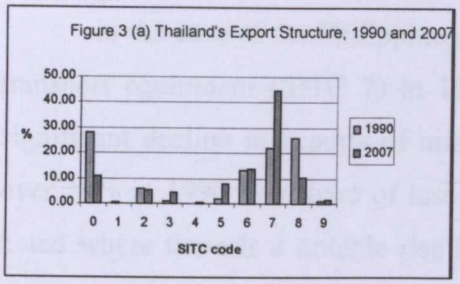
Singapore:

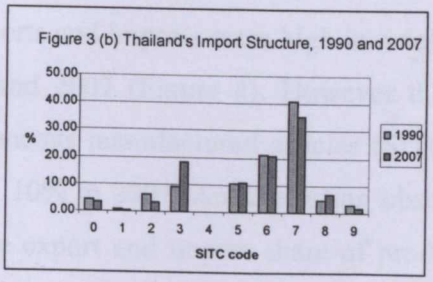
[1] Brief descriptions of product groups are listed in the Appendix.



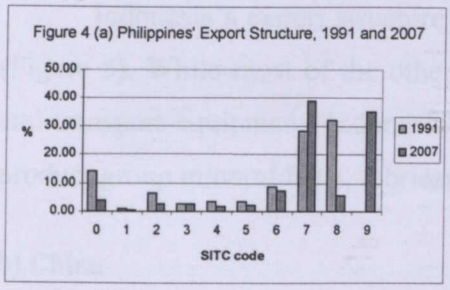


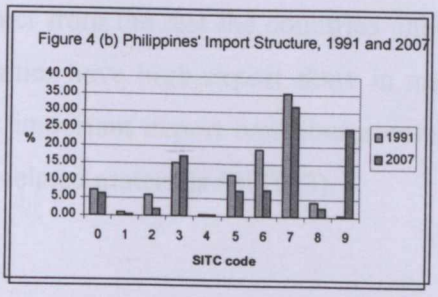
Thailand:



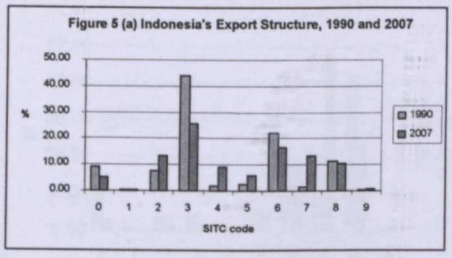


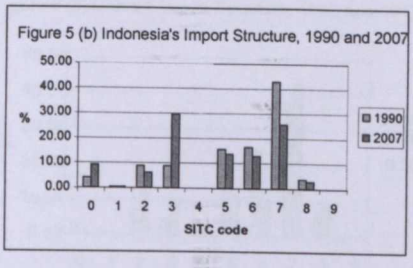
Philippines:





Indonesia:





Among the ASEAN economies, Malaysia's and Singapore's merchandise export and import structure are similar, with high percentage of exports as well as of imports in machinery and transport equipments (SITC 7) (Figure 1 and 2). This is expected since a large portion of Malaysia's exports goes to Singapore before they are reexported to other destinations. For both countries, their own exports pattern are similar to their own imports pattern.

Thailand's export and import patterns resemble Malaysia's and Singapore's to some degree where a significant trade share is observed in machinery and transport equipments (Figure 3). A notable difference is observed for product group '0- food and live animals'. While Malaysia and Singapore have hardly any exports of this category, Thailand has an amount close to 30 per cent of exports in 1990 and about 10 per cent in 2007.

In the case of the Philippines, exports and imports were high in machinery and transport equipment (SITC 7) in 1990 and 2007 (Figure 4). However there was a significant decline in exports of miscellaneous manufactured articles (SITC 8) from over 30% in 1990 to a share of less than 10% in 2007. An interesting observation is noted where there is a notable rise in the export and import share of product group 'SITC 9'. Some of the products listed in this group are postal packages, coin and gold.

Indonesia's export structure is distinct from the rest the countries under study (Figure 5). While most of the other economies have high export share in machinery and transport equipment, Indonesia's most important export contributor comes from product group mineral fuels, lubricants and related materials (SITC 3).

b) China

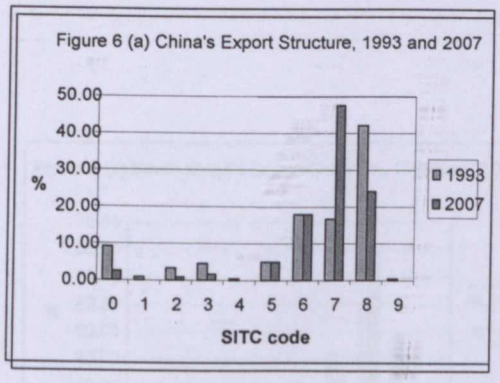


Figure 6 (a) China's Export Structure, 1993 and 2007

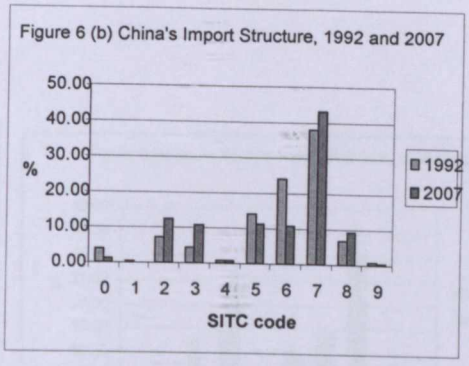


Figure 6 (b) China's Import Structure, 1992 and 2007

China's merchandise exports are mainly manufactured goods classified chiefly by material, machinery and transport equipment and miscellaneous manufactured articles (SITC 6, 7 and 8). While imports spread across all product groups, the bulk of imports are manufactured goods classified chiefly by material and machinery and transport equipment (SITC 6 and 7) (Figure 6). An interesting observation is noted that

there has been a significant rise in exports share of machinery and transport equipment in 2007.

c) Japan and South Korea

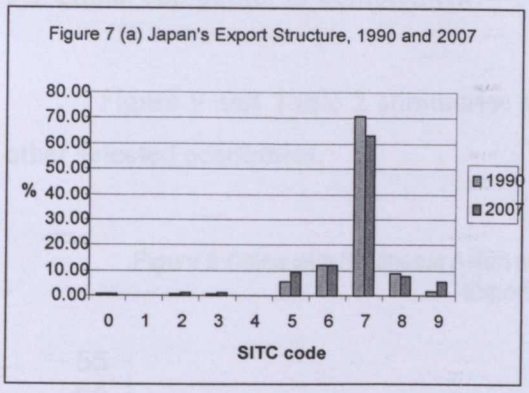


Figure 7 (a) Japan's Export Structure, 1990 and 2007

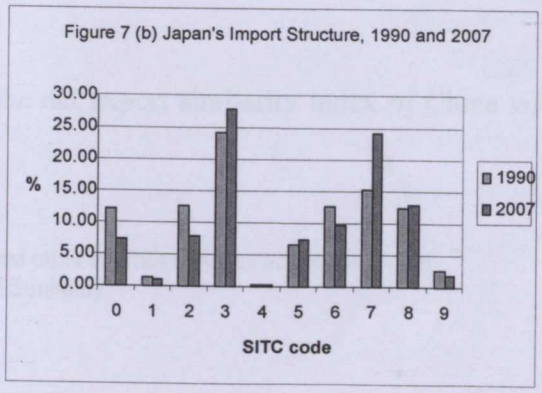


Figure 7 (b) Japan's Import Structure, 1990 and 2007

Unlike the ASEAN economies and China in which their export structures are similar to their own import structures, Japan's import structure is different from its export's (Figure 7). Japan's exports focus in product group '7' for both 1990 and 2007. In these two years, 60 to 70 per cent of Japan's merchandise exports were products from SITC group '7'. However, imports pattern is different. The country has imports of almost every product group, with product group '3' recorded the largest share.

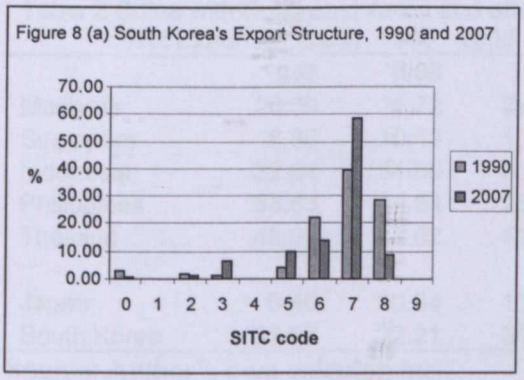


Figure 8 (a) South Korea's Export Structure, 1990 and 2007

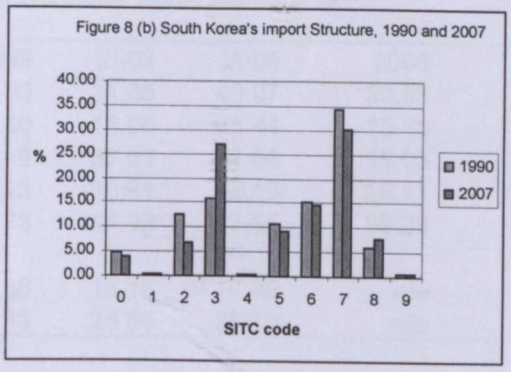


Figure 8 (b) South Korea's import Structure, 1990 and 2007

South Korea's export and import structures are similar to Japan's (Figure 8). In 2007, nearly 60 per cent of its exports are product group '7'. Like Japan, its import

structure differs from its export structure. While imports of product group '7' are significant, imports of other groups, such as group '3' and '6' are also sizeable.

5. Results

5.1 China: competitor or complement?

Figure 9 and Table 2 summarise the net export similarity index of China with other selected economies.

Figure 9 China with Southeast Asian and other Northeast Asian economies - Net Export Similarity

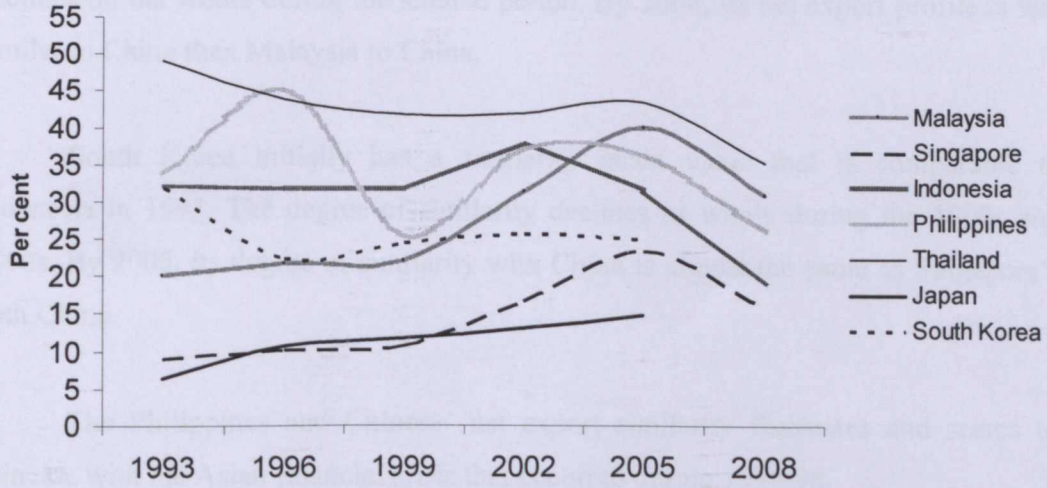


Table 2 China with Southeast Asian and other Northeast Asian economies – Net Export Similarity, 1993 - 2008

	1993	1996	1999	2002	2005	2008
Malaysia	20.09	21.72	22.00	31.35	40.07	30.95
Singapore	8.86	10.13	10.80	16.60	23.44	15.85
Indonesia	32.04	31.60	31.48	37.63	31.56	19.03
Philippines	33.63	44.84	25.22	36.91	36.10	26.11
Thailand	48.95	43.62	41.73	41.93	43.55	35.29
Japan	6.40	10.64	11.66	13.15	14.89	n/a
South Korea	31.86	22.21	24.33	25.58	25.10	n/a

Source: Author's own calculations.

A number of observations are noted from the results. First, among all the countries under the present study, Thailand has the highest similarity in its net export profiles with China's but the degree of similarity is declining gradually over time.

On the contrary, Japan and Singapore have the lowest similarity in their net export profiles with China. For Japan, the degree of similarity is relatively stable throughout the studied period. For Singapore, the degree of similarity rises especially during the period 1999-2005. However, similarity declines in 2008.

In the case of Malaysia, China's net exports profile seems to converge with Malaysia's over time except in 2008, indicating China's growing competition with Malaysia. Conversely, in the case of Indonesia, which initially had a higher similarity index than Malaysia from the early 1990s to early 2000s, the degree of similarity declines on the whole during the studied period. By 2008, its net export profile is less similar to China than Malaysia to China.

South Korea initially has a similarity index value that is comparable to Indonesia in 1993. The degree of similarity declines as whole during the 1990s and 2000s. By 2005, its degree of similarity with China is almost the same as Singapore's with China.

The Philippines and Chinese' net export similarity fluctuates and seems to coincide with the Asian financial crisis that occurred during 1997/98.

There seems to have a general decline in net export similarity in 2008. One possible reason for this to happen could be the onset of the US financial crisis which affects the export performance of all countries under study towards the end of 2008.

The simple analyses here provide further supporting evidences that China does seem to pose some threats to the ASEAN economies in manufacturing industries, perhaps with the exclusion of Singapore since Singapore's economic structure relies much more on services industry. Results are also consistent with the literature that China's net exports are not converging with the Northeast Asian economies and hence the country does not seem to out-compete the developed ones such as Japan.

5.2 Malaysia's competition within ASEAN

This sub-section looks specifically at Malaysia's net export similarity with other ASEAN economies.

Figure 10 Malaysia with other ASEAN economies - Net Export Similarity, 1993-2008

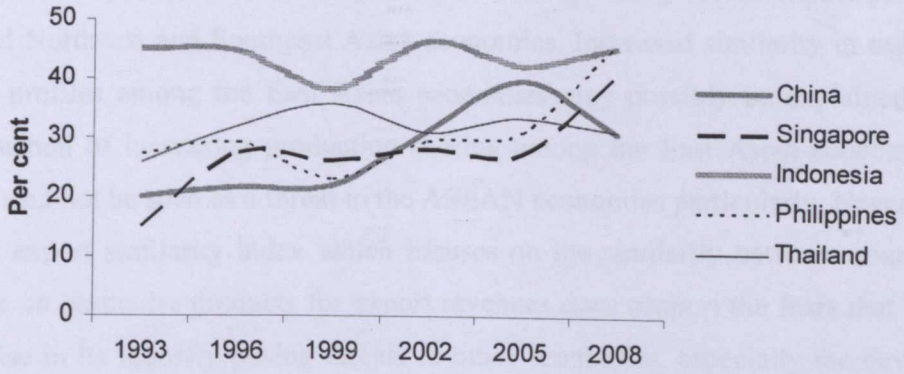


Table 3 Malaysia with other ASEAN economies - Net Export Similarity, 1993 - 2008

	1993	1996	1999	2002	2005	2008
China	20.09	21.72	22.00	31.35	40.06	30.95
Singapore	14.73	27.56	26.28	28.07	27.35	41.12
Indonesia	44.76	44.39	38.01	46.31	42.15	45.54
Philippines	26.96	28.92	22.85	29.50	30.93	46.55
Thailand	25.74	31.85	35.96	30.87	33.44	31.29

Source: Author's own calculations

As a whole, the ASEAN economies' export profiles are converging with Malaysia's over time. This suggests that Malaysia faces increasing competition with other ASEAN economies in export earnings. Among the ASEAN economies, Indonesia has the highest similarity in export profile with Malaysia. This is followed by Thailand. In addition, Malaysia's net export profile becomes more similar to Singapore and the Philippines over time.

With increasing competition Malaysia faces and with evidences that the country has lost its comparative advantages in labour-intensive manufactures and has yet to establish firmly in high technology manufactures (Mahani and Loke 2008), Malaysia is expected to face more challenges in the next decade.

6. Concluding remarks

This paper conducts a simple exercise in assessing recent export profiles of selected Northeast and Southeast Asian economies. Increased similarity in export and import profiles among the East Asian economies may possibly be explained by the phenomenon of increasing production sharing among the East Asian economies and hence need not be seen as a threat to the ASEAN economies particularly. Nevertheless, the net export similarity index which focuses on the similarity between countries in reliance on particular products for export revenues does support the fears that China's rapid rise in its industry posing threats to other economies, especially the developing ASEAN economies. Investigations into data for recent few years show that the degree of net export similarity among the East Asian economies, particularly within the ASEAN, continues to be high.

The results also indicate that Malaysia has yet to position itself to a higher end of production chain of manufacturing so as to be complementing, rather than competing with China in the international production networks.

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Appendix

SITC Rev 3 Codes and Descriptions

SITC Rev 3, 1-digit level:

Code	Description
0	Food and live animals
1	Beverages and tobacco
2	Crude materials, inedible, except fuels
3	Mineral fuels, lubricants and related materials
4	Animal and vegetable oils, fats and waxes
5	Chemicals and related products, n.e.s.
6	Manufactured goods classified chiefly by material
7	Machinery and transport equipment
8	Miscellaneous manufactured articles
9	Commodities and transactions not classified elsewhere in the SITC

Selected codes and descriptions at 2-digit level:

77	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)
78	Road vehicles (including air-cushion vehicles)
79	Other transport equipment
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.
82	Furniture, and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings
83	Travel goods, handbags and similar containers
84	Articles of apparel and clothing accessories
85	Footwear
87	Professional, scientific and controlling instruments and apparatus, n.e.s.
88	Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks
89	Miscellaneous manufactured articles, n.e.s.
91	Postal packages not classified according to kind
93	Special transactions and commodities not classified according to kind
96	Coin (other than gold coin), not being legal tender
97	Gold, non-monetary (excluding gold ores and concentrates)

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